Listing of Claims:

1. (Currently amended) In a network comprising a plurality of nodes interconnected by optical fiber segments, a method of determining the viability of a signal path through the network, comprising the steps of:

identifying at least one optical effect that impacts the viability of the signal path;

identifying at least one dominant source which impacts each identified optical effect;

identifying at least one base variable upon which ~~the~~ each identified ~~optical effects~~ dominant source depends;

approximating a value for the impact of each identified optical effect on the performance of a signal as a function of each identified dominant source and each identified base variable;

assigning a performance value to the signal at its introduction into the network;

for each successive segment in the signal path, recalculating the impact of each identified optical effect on the performance value as the signal passes through the segment; and

comparing the resulting performance of the signal after passage along the signal path against an acceptable threshold to determine the path's viability.

2. (Currently amended) The method according to claim 1 wherein the step of recalculating comprises the steps of:

calculating the value of each identified base variable;

calculating the impact of each identified dominant source based on the calculated value of each identified base variable;

calculating the impact of each identified optical effect in the segment based on the calculated value of the impact of each identified ~~base variable~~ dominant source; and

calculating the resulting performance of the signal resulting from the optical effects encountered while passing through the segment.

3. (Original) The method according to claim 2 further comprising the step of:

calculating the resulting performance of the signal resulting from the optical effects encountered while passing through the node at which the segment terminates.

4. (Original) The method according to claim 3 further comprising the steps of:

measuring the current performance of the signal; and

re-calculating the resulting performance of the signal using a measure of the current performance.

5. (Currently amended) The method according to claim 1 wherein ~~an~~ the at least one identified base variable is one or more of the fiber type, the length of the segment, the number of wavelength, the length for each fiber span within the segment, the power level input into each span.

6. – 8. (Cancelled)

9. (Currently amended) The method according to claim 1 wherein ~~an~~ the at least one identified optical effect is a distortion effect.

10. (Currently amended) The method according to claim 9 wherein the ~~effect~~ at least one identified dominant source is one or more of dispersion, self-phase modulation, cross-phase modulation, four-wave mixing.

11. – 13. (Cancelled)

14. (Currently amended) The method according to claim 1 where ~~an~~ the at least one identified optical effect is a noise effect.

15. (Currently amended) The method according to claim 14 wherein the ~~effect~~ at least one identified dominant source is one or more of amplified spontaneous emission, stimulated Brillouin scattering, stimulated Raman scattering, multi-path interfernce.

16. – 18. (Cancelled)

19. (Original) The method according to claim 1 wherein the approximated function is linear.

20. (Original) The method according to claim 1 wherein the performance is measured by bit error rate.

21. (Original) The method according to claim 1 wherein the performance is measured by optical signal-to-noise ratio.

22. (Original) The method according to claim 1 wherein the performance is measured by Q.

23. (Original) The method according to claim 1 wherein the performance is measured by an accumulation of penalty points.

24. (Currently amended) In a communications network comprising a plurality of nodes interconnected by segments of optical fiber, a node comprising:

a quantifier to determine the value of at least one identified ~~base variable~~ dominant source upon which at least one identified optical effects that impact the viability of the signal path ~~are~~ is dependent;

a quantifier to determine the value of at least one identified base variable upon which each identified dominant source is dependent;

an approximator to determine the value of the impact of each identified optical effect on the viability of the signal path;

a calculator to determine the impact of each identified optical effect on the performance of a signal passing through a segment in the signal path; and

a comparator to determine if the resulting performance of the signal at the end of the signal path satisfies an acceptable threshold.

25. (Original) The apparatus of claim 24 wherein the node is an OAM (Operations, Administration and Maintenance) node associated with the network.

26. (Currently amended) In a communications network comprising a plurality of nodes interconnected by segments of optical fiber, a transmitter node, interconnected with at least one downstream node by a downstream segment along which it is adapted to send signals, comprising:

a quantifier to determine the value of at least one identified ~~base variable~~ dominant source upon which at least one identified optical effects that impact the viability of the signal path ~~are~~ is dependent for the at least one downstream segment;

a quantifier to determine the value of at least one identified base variable upon which each identified dominant source is dependent;

an approximator to determine the value of the impact of each identified optical effect on the viability of the signal path along the at least one downstream segment;

a calculator to determine the impact of each identified optical effect on the performance of a signal passing through the at least one downstream segment; and

a communicator for communicating the resulting performance value along the at least one downstream segment to the corresponding downstream node.

27. (Original) The apparatus of claim 26, wherein the performance value is communicated along an OSC channel in the segment.

28. (Currently amended) In a communications network comprising a plurality of nodes interconnected by segments of optical fiber, an intermediate node interconnected with at

least one upstream node by an upstream segment from along which it is adapted to receive signals and with at least one downstream node by a downstream segment along which it is adapted to send signals, comprising:

a receiver for receiving a previous performance value from the at least one upstream node along the segment interconnecting the two nodes;

a quantifier to determine the value of at least one identified ~~base variable~~ dominant source upon which at least one identified optical effects that impact the viability of the signal path ~~are~~ is dependent for the at least one downstream segment;

a quantifier to determine the value of at least one identified base variable upon which each identified dominant source is dependent;

an approximator to determine the value of the impact of each identified optical effect on the viability of the signal path along the at least one downstream segment;

a calculator to determine the impact of each identified optical effect on the performance of a signal passing through the at least one downstream segment; and

a communicator for communicating the resulting performance value along the at least one downstream segment to the corresponding downstream node.

29. (Original) The apparatus of claim 28, wherein the previous performance value is received from along an OSC (Optical Service Channel) channel in the upstream segment.

30. (Original) The apparatus of claim 28, wherein the resulting performance value is communicated along an OSC channel in the downstream segment.

31. – 33. (Cancelled)

34. (Currently amended) A computer-readable medium for storing computer-executable instructions which, when executed by a processor in a node in a communications network comprising a plurality of nodes interconnected by segments of optical fiber, cause the node to:

determine the value of at least one identified base variable upon which ~~optical effects~~ at least one identified dominant source that impacts ~~the viability of the signal path~~ at least one identified optical effect ~~are~~ is dependent;

determine the value of the impact of each identified dominant source for each identified optical effect;

determine the value of the impact of each identified optical effect on the viability of the signal path;

determine the impact of each identified optical effect on the performance of a signal passing through a segment in the signal path; and

determine if the resulting performance of the signal at the end of the signal path satisfies an acceptable threshold.

35. (Currently amended) A computer-readable medium for storing computer-executable instructions which, when executed by a processor in a transmitter node in a communications network, interconnected with at least one downstream node by a downstream segment along which it is adapted to send signals, cause the transmitter node to:

determine the value of at least one identified base variable upon which at least one identified dominant source that impacts at least one identified optical effect is dependent;

determine the value of ~~at least one base variable~~ the impact of each identified dominant source upon which each identified optical effects ~~that~~ impacts the viability of the signal path is ~~are~~ dependent for the at least one downstream segment;

determine the value of the impact of each identified optical effect on the viability of the signal path along the at least one downstream segment;

determine the impact of each identified optical effect on the performance of a signal passing through the at least one downstream segment; and

communicate the resulting performance value along the at least one downstream segment to the corresponding downstream node.

36. (Currently amended) A computer-readable medium for storing computer-executable instructions which, when executed by a processor in an intermediate node in a communications network, interconnected with at least one upstream node by an upstream segment from along which it is adapted to receive signals and with at least one downstream node by a downstream segment along which it is adapted to send signals, cause the intermediate node to:

receive a previous performance value from the at least one upstream node along the segment interconnecting the two nodes;

determine the value of at least one identified base variable upon which at least one identified dominant source that impacts at least one identified optical effect is dependent;

determine the value of ~~at least one base variable~~ the impact of each identified dominant source upon which each identified optical effects that impacts the viability of the signal path is ~~are~~ dependent for the at least one downstream segment;

determine the value of the impact of each identified optical effect on the viability of the signal path along the at least one downstream segment;

determine the impact of each identified optical effect on the performance of a signal passing through the at least one downstream segment; and

communicate the resulting performance value along the at least one downstream segment to the corresponding downstream node.

37. (Cancelled)